IT BTEC

Unit 2

Creating Systems to Manage Information

Today’s Lesson

- What is a database?
- Knowing the difference between a flat file database and a relational database
- Determining a sensible structure for a database

What is a Database?

- **Database -** a structured set of data held in a computer
- A database is a computerised system that makes it easy to search, select and store **information**. Databases are used in many different places.
- Your school might use a database to store information about attendance or to store pupils' and teachers' contact information. A database like this will probably be protected with a password to make sure that people’s personal information is kept safe.
- Your library might also use a database to keep track of which books are available and which are on loan.

What is a Database?

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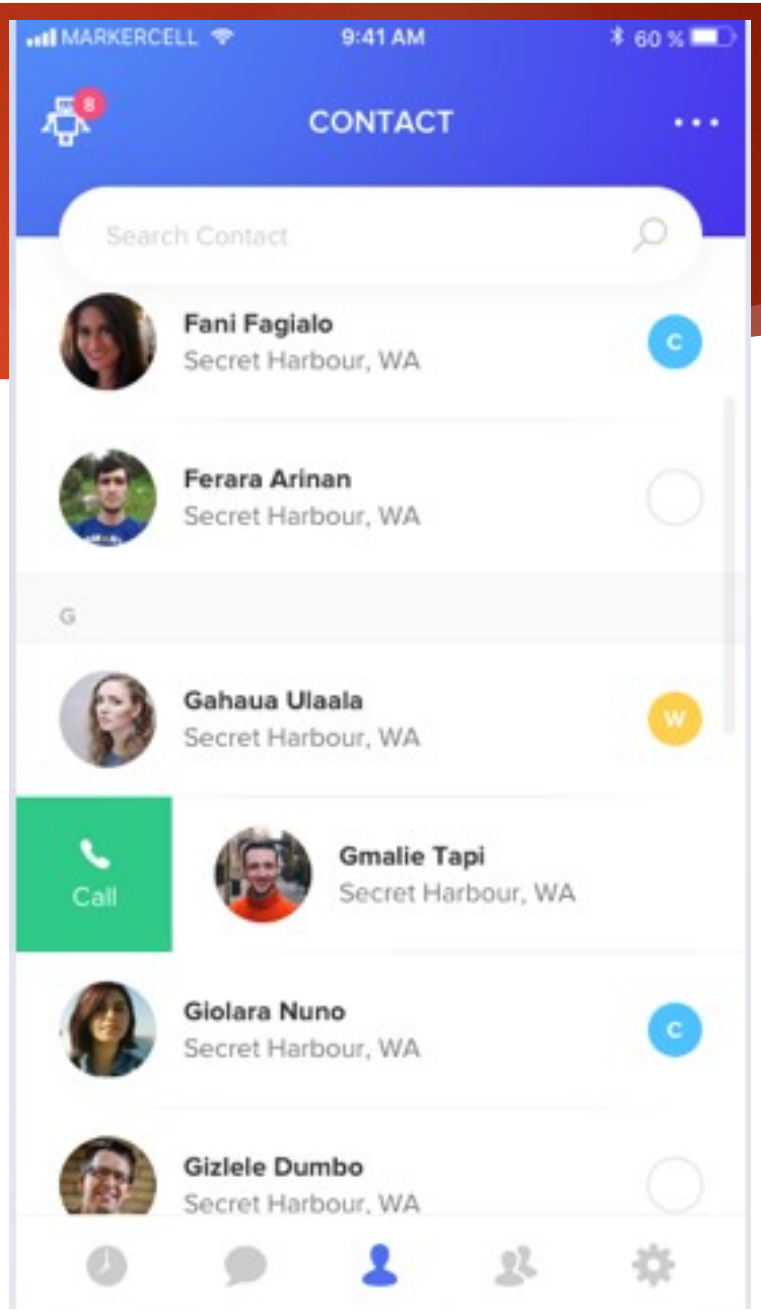
What information is being stored in your Contacts?



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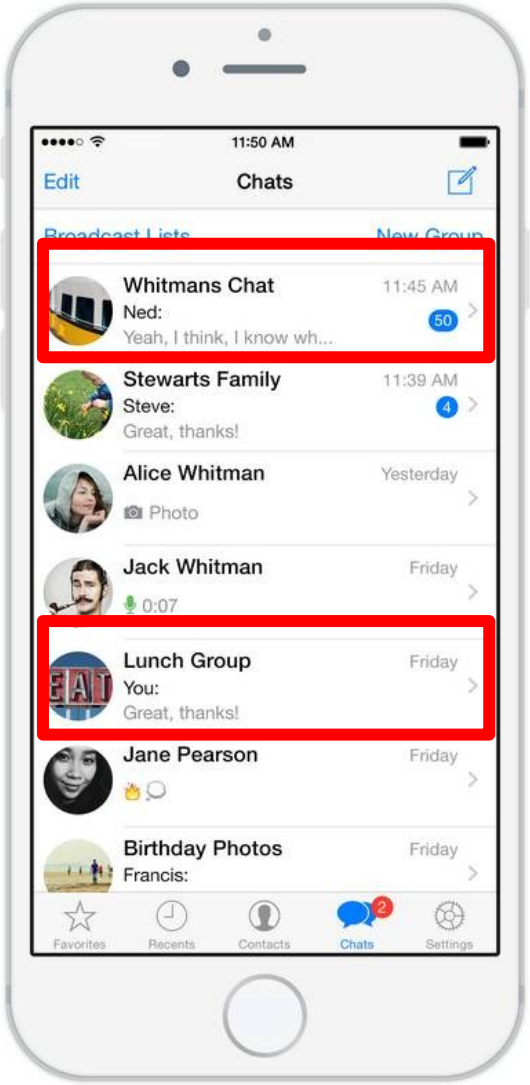
What might this database look like?



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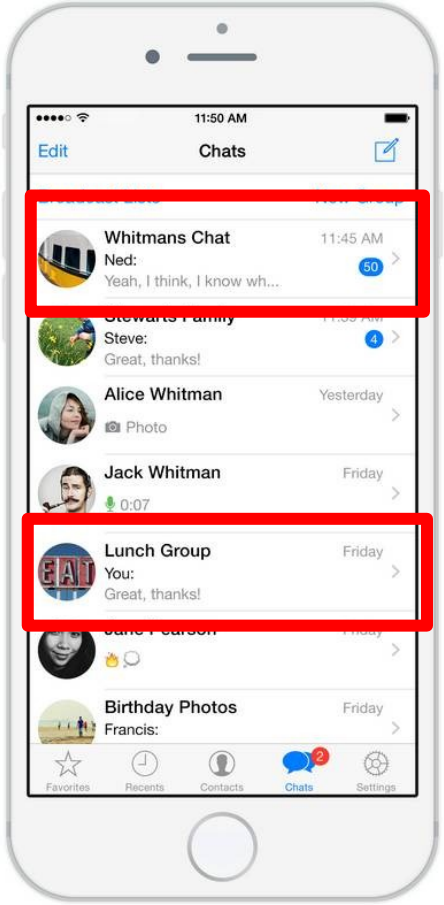
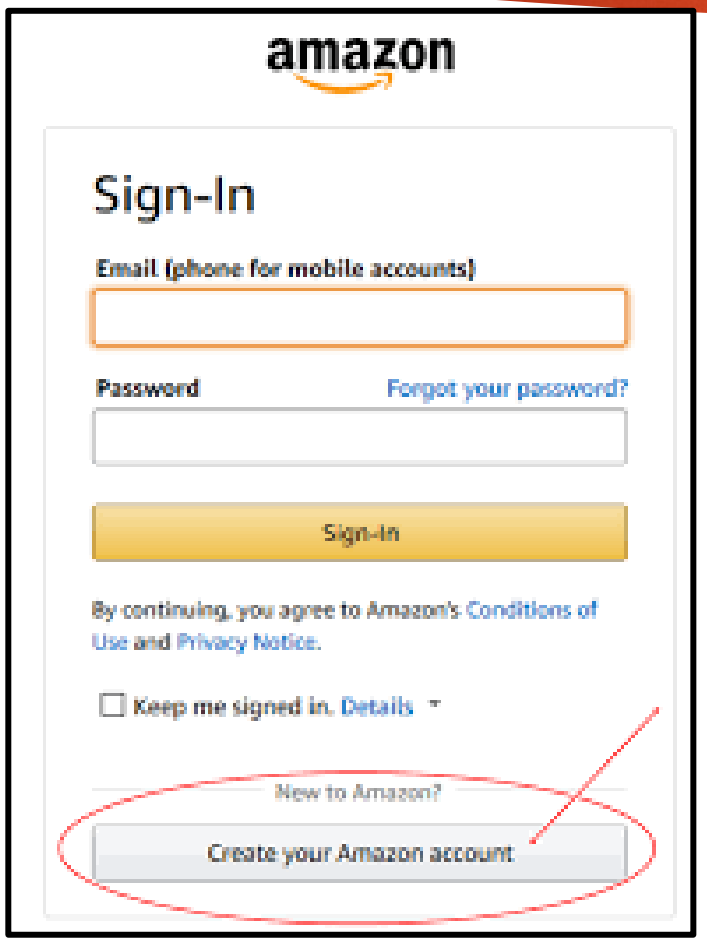
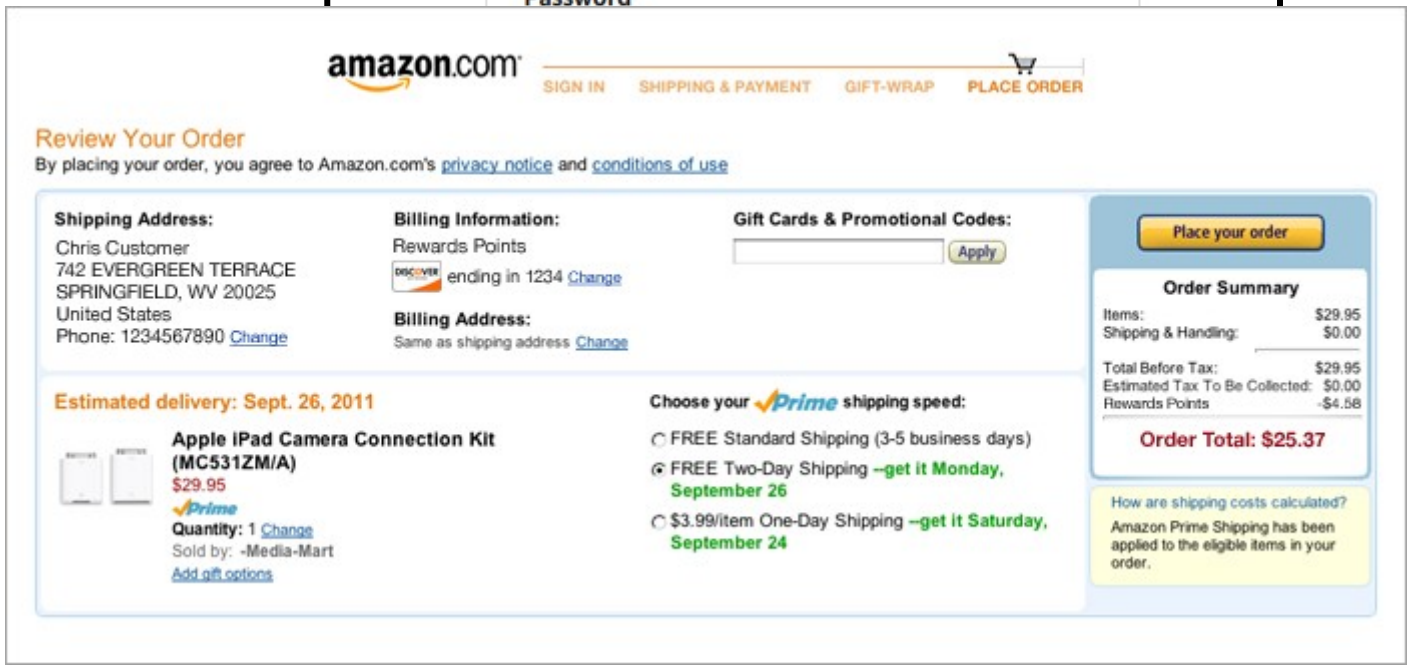


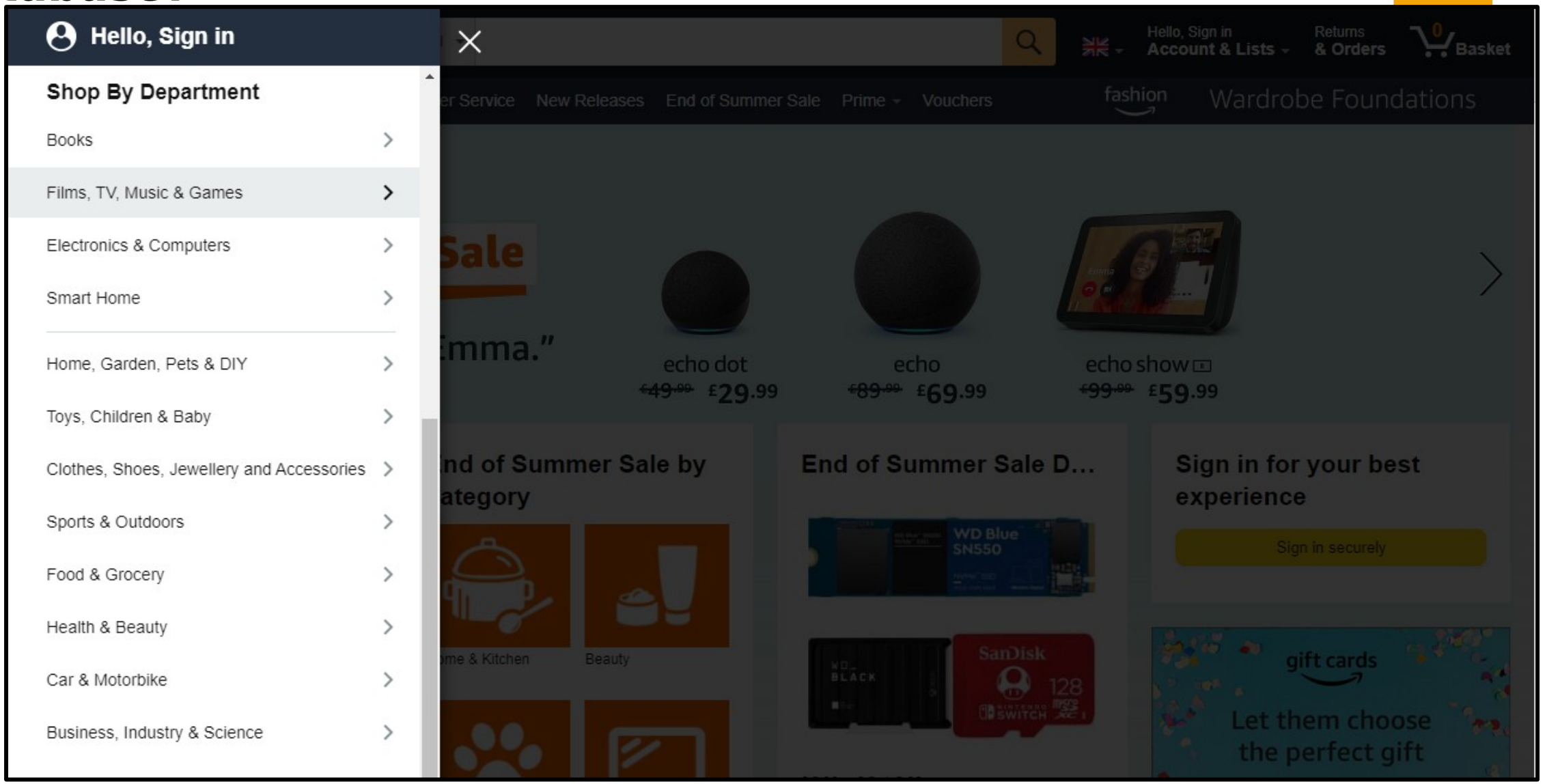
Phone Contacts	Groups	Phone contacts added to groups

What is a Database?





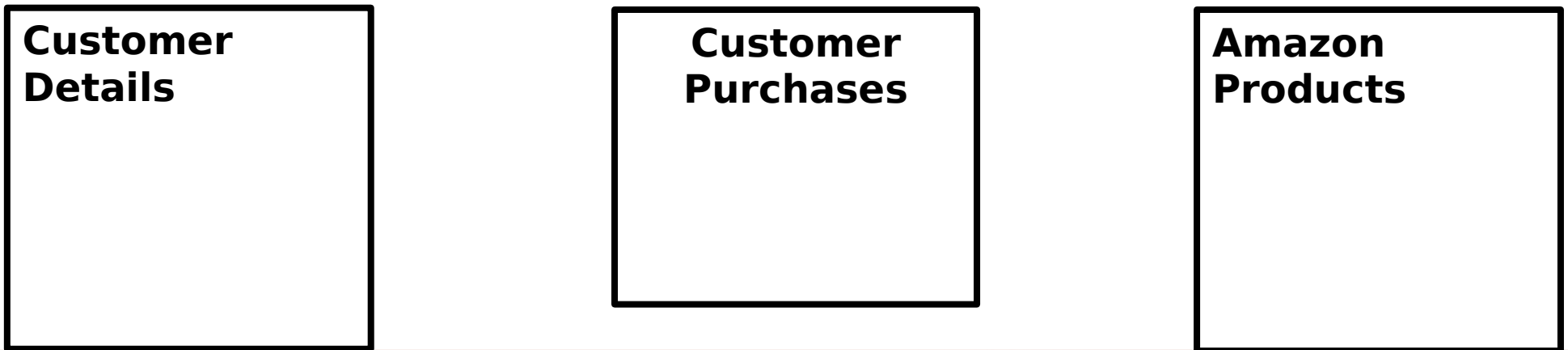
What information is stored in Amazon's database?



What is a Database?

What information is being stored in Amazon's Database?

- The customer's details – name, e-mail, password, address, payment details
- Customer purchases
- The products they sell – grouped in categories



Starter Activity

Search the internet for a '**database designer**' job.

What does a database designer do?

How much do they earn?

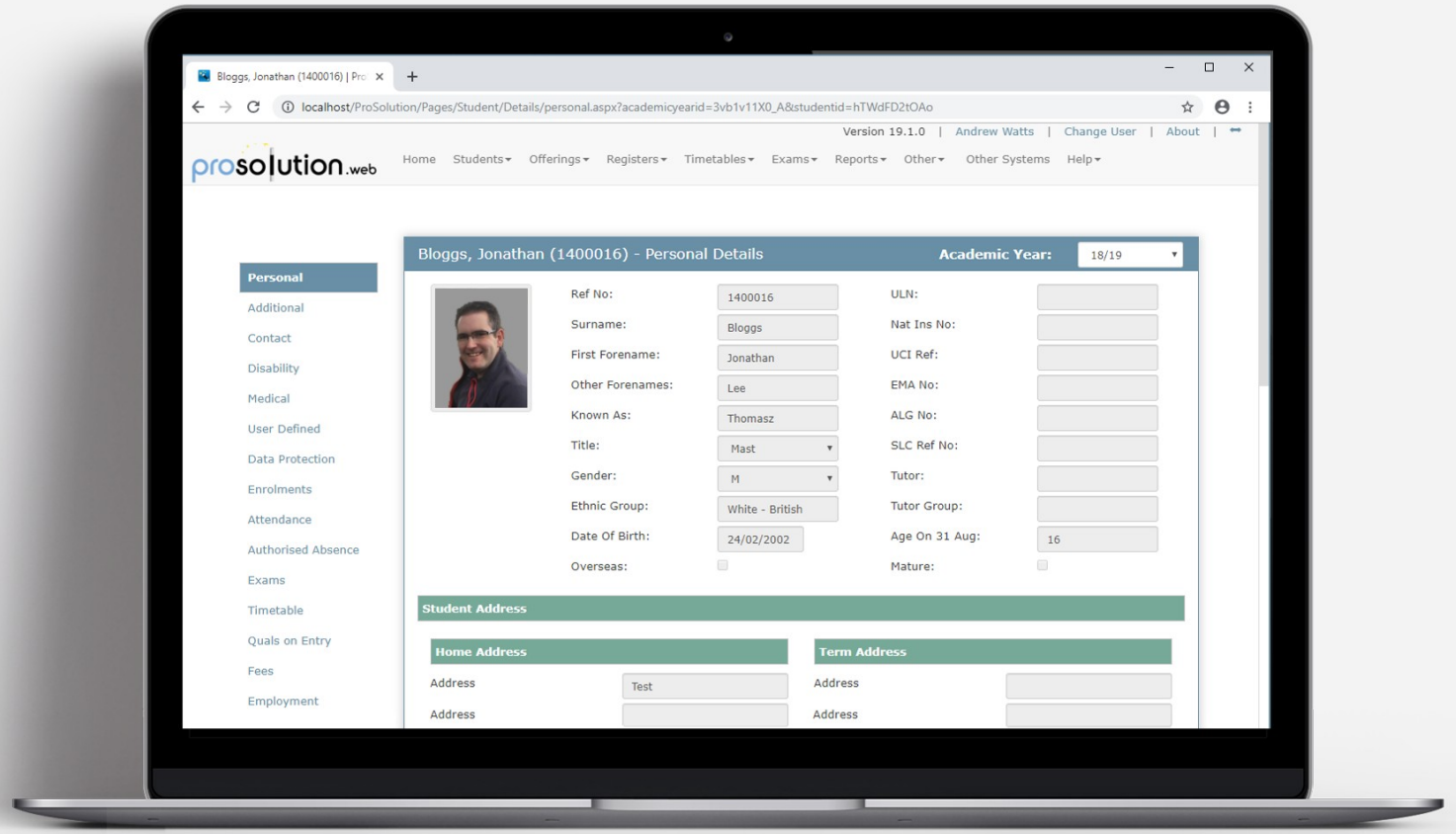
Extension: Look for a starter job – a junior role in database design.

Database Terminology

- **Field** - a piece of information related to a single person or thing (e.g. a student's name or ID in the student table)

Student ID	Student Name	Student Address 1	Student Address 2	Student Address 3	Student Post Code	Student Phone Number	Student Next of Kin	Course ID	Course Name	Teacher	Room

Student Records Database



Database Terminology

- **Record** – related fields are grouped together to form a record, e.g. all the information about a single student in the student table.

Student ID	Student Name	Student Address 1	Student Address 2	Student Address 3	Student Post Code	Student Phone Number	Student Next of Kin	Course ID	Course Name	Teacher	Room

Database Terminology

- **Table** – stores data about a particular subject, such as employees or products or students or courses. A table has records (rows) and fields (columns).

Student ID	Student Name	Student Address 1	Student Address 2	Student Address 3	Student Post Code	Student Phone Number	Student Next of Kin	Course ID	Course Name	Teacher	Room

Database Records – Flat File Database

Add the following ‘Records’ to your ‘Table’

Student ID 21001

Jack Smith,

33 High Street,

Dagenham,

Essex RM22 1BQ

Course ID 21656, Maths, Teacher Marion, Room B20

Course ID 21330, English, Teacher Rob, Room M11

Course ID 21885, History, Teacher Sally, Room L55

Student ID 21002

Adil Patel,

64 Cross Drive,

Romford,

Essex RM19 2NF

Course ID 21959, Politics, Teacher Tony, Room R33

Course ID 21211, ICT, Teacher Julie, Room B03

Course ID 21656, Maths, Teacher Marion, Room L55

Student ID	Student Name	Student Address 1	Student Address 2	Student Address 3	Student Post Code	Student Phone Number	Student Next of Kin	Course ID	Course Name	Teacher	Room

Database Records

Add the following ‘Records’ to your ‘Table’

Student ID 21003

Sahra Chan,

155 Maldon Close,

Hornchurch,

Essex RM14 1SS

Course ID 21959, Politics, Teacher Tony, Room B20

Course ID 21330, English, Teacher Rob, Room M11

Course ID 21211, ICT, Teacher Julie, Room B03

Student ID 21004

Lucy Jones,

64 Cross Drive,

Romford,

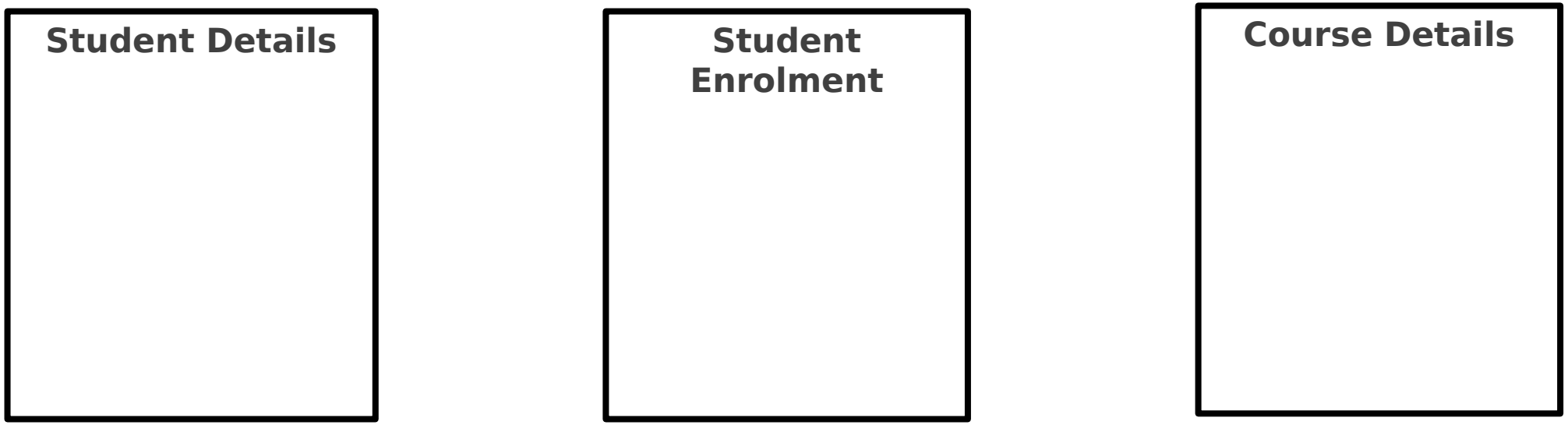
Essex RM19 2NF

Course ID 21959, Politics, Teacher Tony, Room R33

Course ID 21211, ICT, Teacher Julie, Room M11

Course ID 21656, Maths, Teacher Marion, Room L55

Relational Database



Database Terminology

- **Database -** a structured set of data held in a computer
- **Flat file database –** this is a database of just one table. It can be created in database software or in a spreadsheet. An example might be a list of names and addresses.
- **Relational database -** A relational database organises data into **tables** which can be linked—or related—based on data common to each. This capability enables you to retrieve an entirely new table from data in one or more **tables** with a single query. This is used for more complex data – e.g. names and address + bookings or purchases.

Database Validation

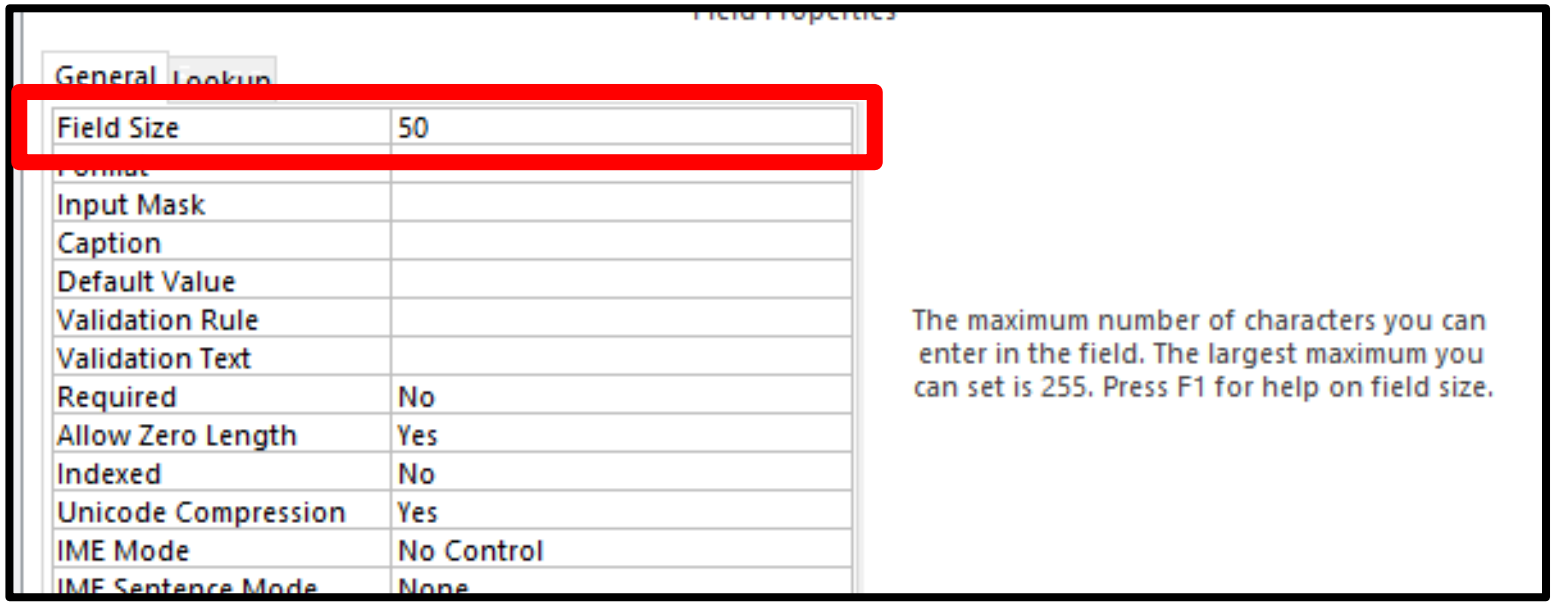
- **Validation** is an automatic computer check to ensure that the data entered is sensible and reasonable. It does not check the accuracy of data.
- Types of validation:
  - Length check
  - Format Check
  - Range Check
  - Presence check
  - Value lookup (list)

- Validation is applied in the ‘Properties’ of each field in the database

Database Validation

Examples for your Student Enrolment Database

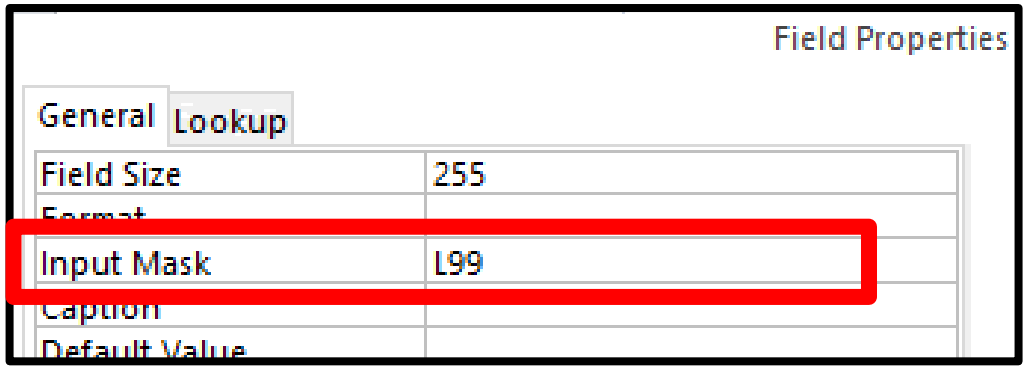
- Length Check – change the ‘Field Size’ property for each field to reflect the number of characters you would expect as a maximum
- Test that the validation works



Database Validation

Examples for your Student Enrolment Database

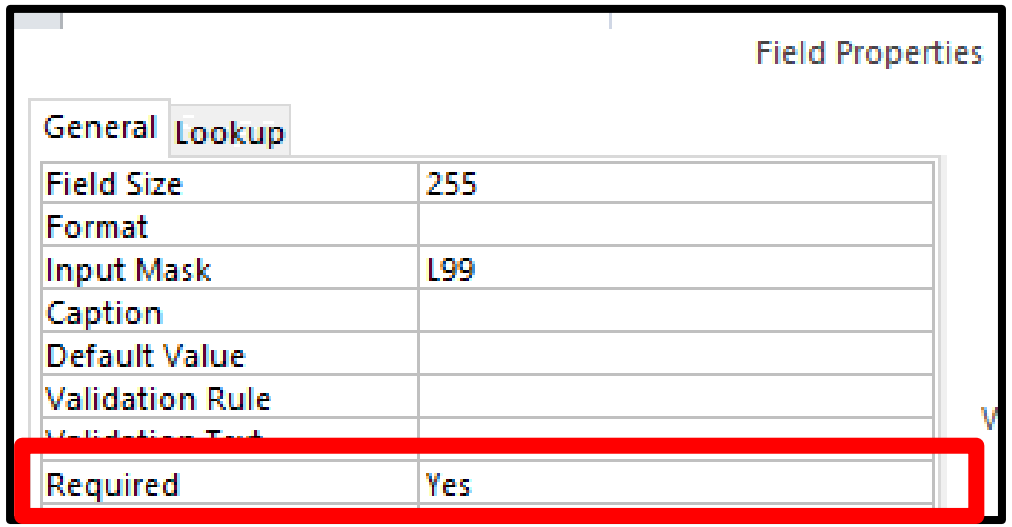
- Format Check – use the ‘Input Mask’ property for the Room Number field. Note that all room numbers have the same format – one letter and two numbers (e.g. B20)
- Input mask rule: Use the letter ‘L’ to specify that a letter must be entered and ‘9’ to specify that a digit must be entered.
- Test that it works



Database Validation

Examples for your Student Enrolment Database

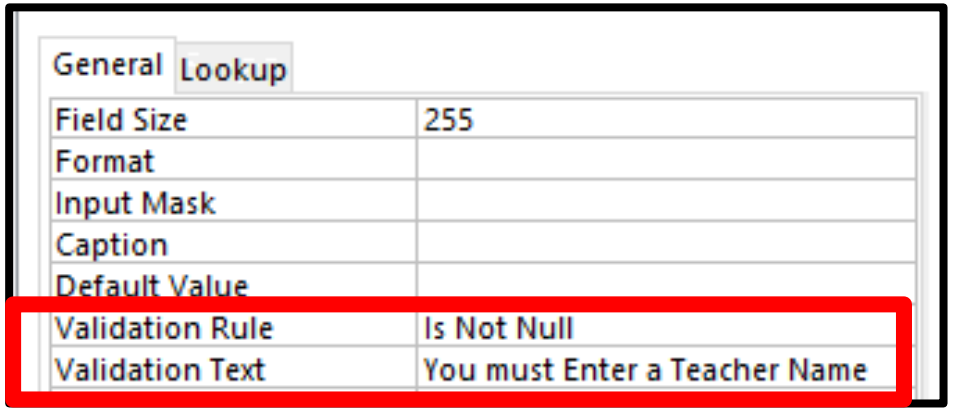
- Presence Check – Use the ‘Required’ property – change it to ‘yes’ to specify that a field cannot be left blank – data must be entered
- Do this for the ‘Room’ field and test that it works



Database Validation

Examples for your Student Enrolment Database

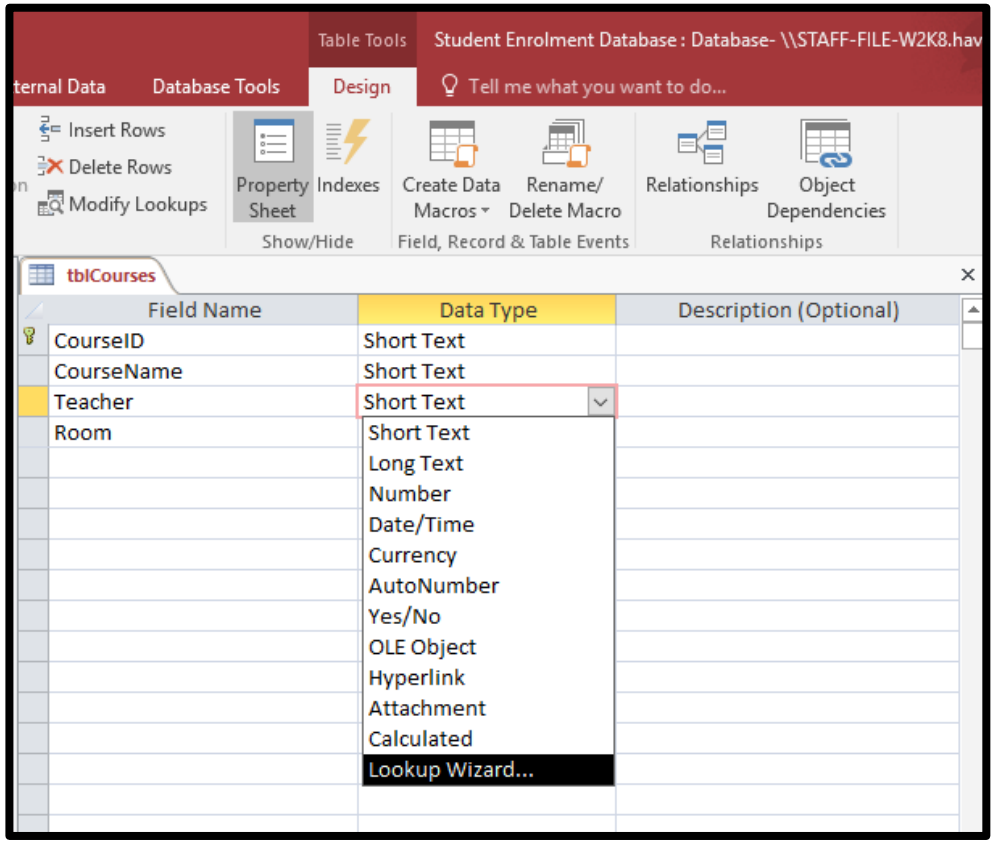
- Presence Check – an alternative way to do a presence check is through the ‘Validation Rule’ property
- You use the term ‘Is Not Null’
- Do this for the ‘Teacher’ field and test that it works
- Note that for this property you also add ‘Validation Text’, which is a prompt for the user



Database Validation

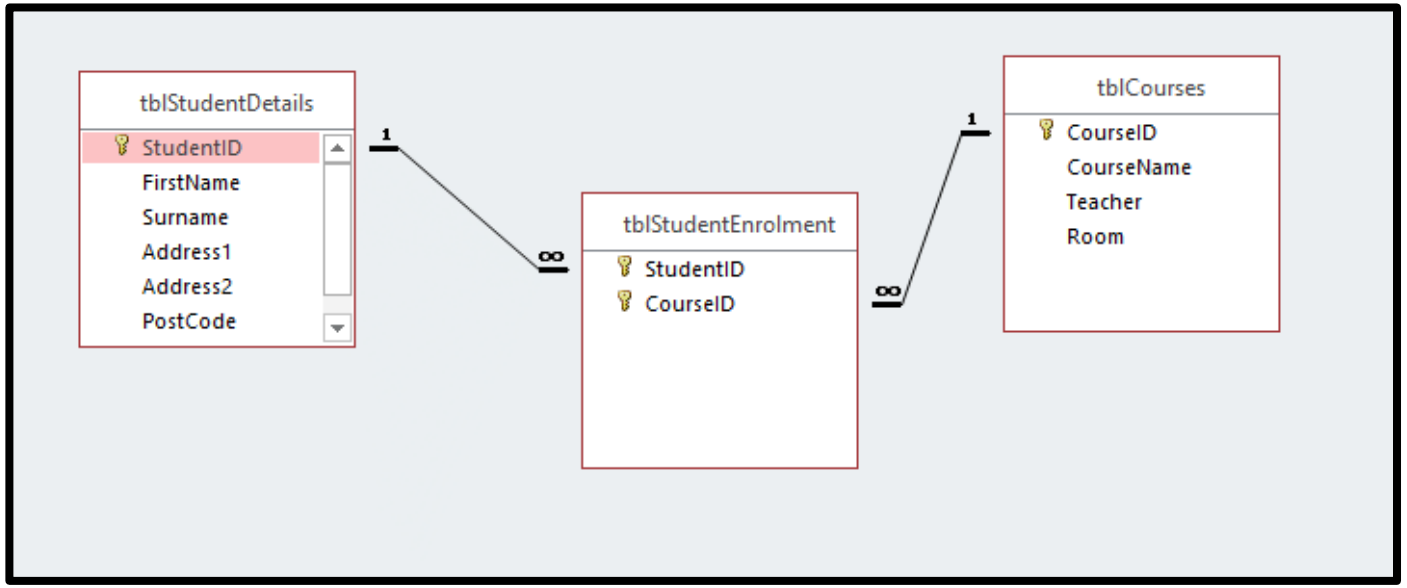
Examples for your Student Enrolment Database

- Value Lookup – You can use the ‘Lookup’ property to create a list to choose from, or alternatively you can do this through a wizard in the ‘Data Type’
- Do this for the ‘Teacher’ field and test that it works
- Once you have used the wizard in the Data Type column, have a look at the syntax that is automatically created in the ‘Lookup’ property



Database Relationships

- Create relationships between the tables (‘Database Tools’, ‘Relationships’)
- Note that the data type for Student ID must be number in both tables – the same applies to Course ID.
- Linking the tables like this allows you to bring data together from multiple tables



Entering Records (Test Data)

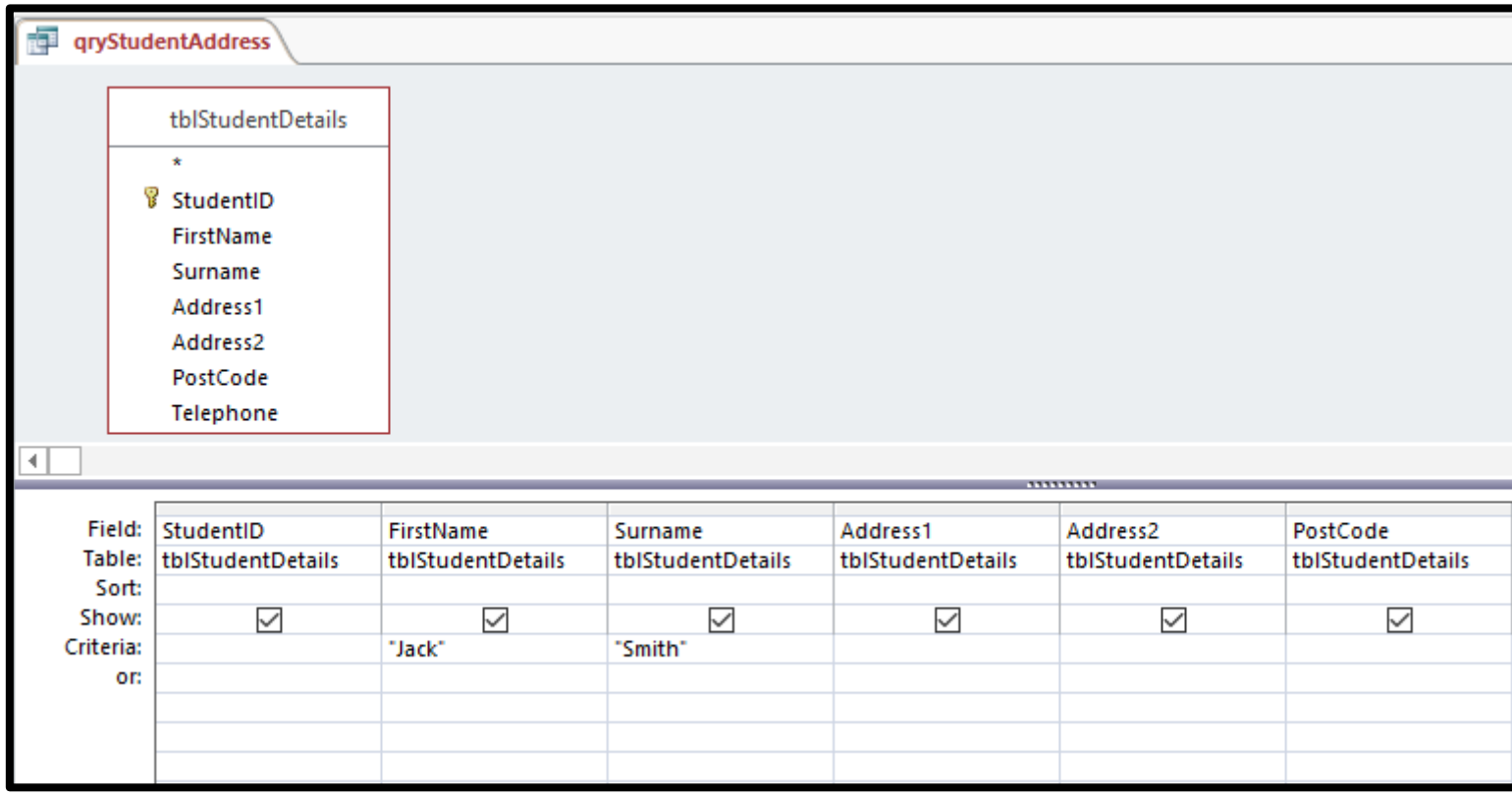
- Enter the student and course data again – this time in your Access database tables (copy from your flat file spreadsheet)

Database Queries

- You can search for information from all three tables by creating a ‘Query’ (‘Create’, ‘Query Design’).

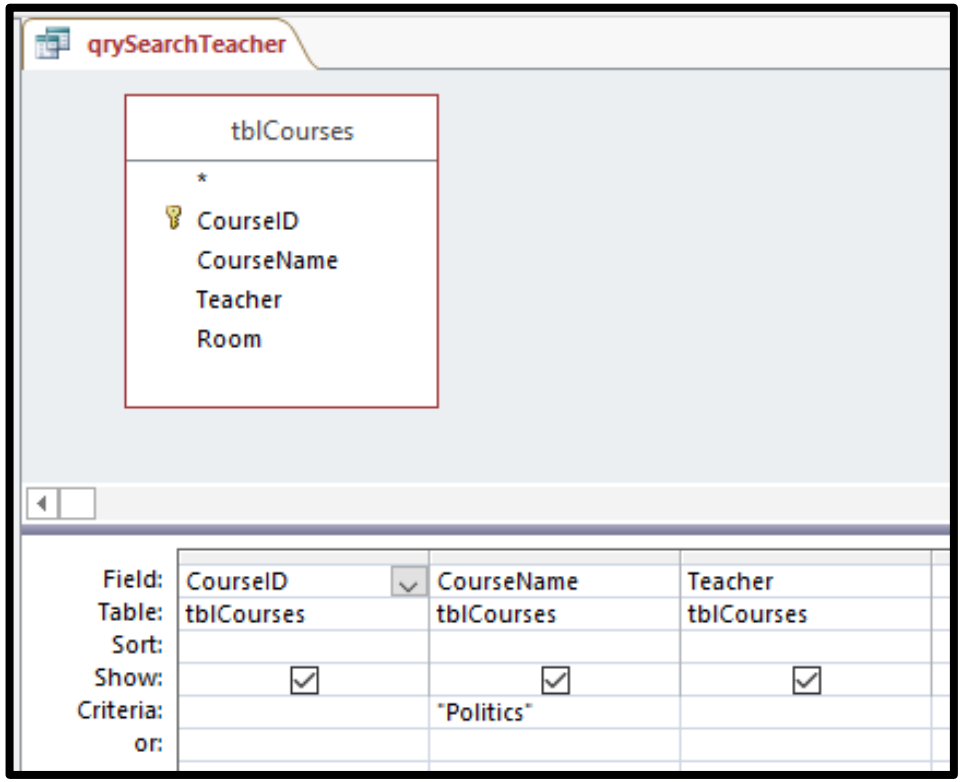
Search for Jack Smith’s address

Save the query



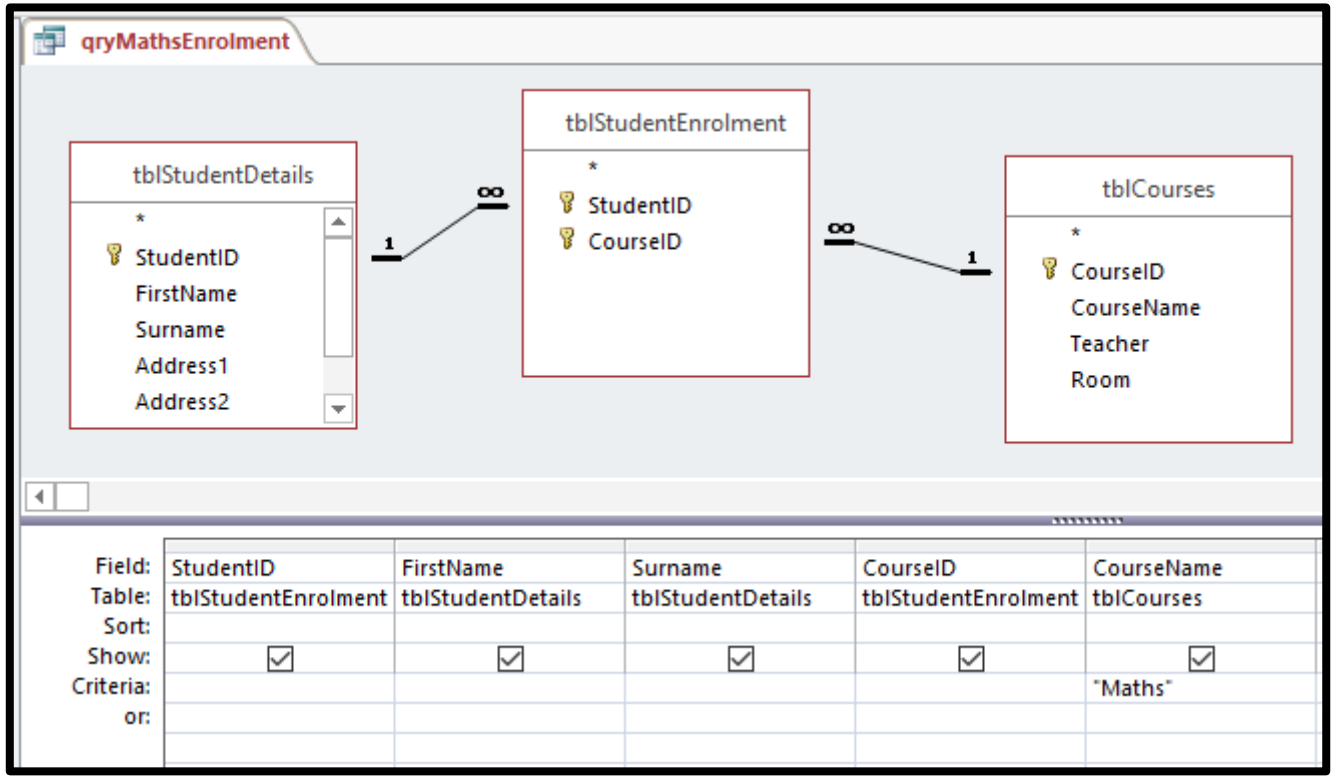
Database Queries

- Search for the name of the Politics teacher
- Save the query



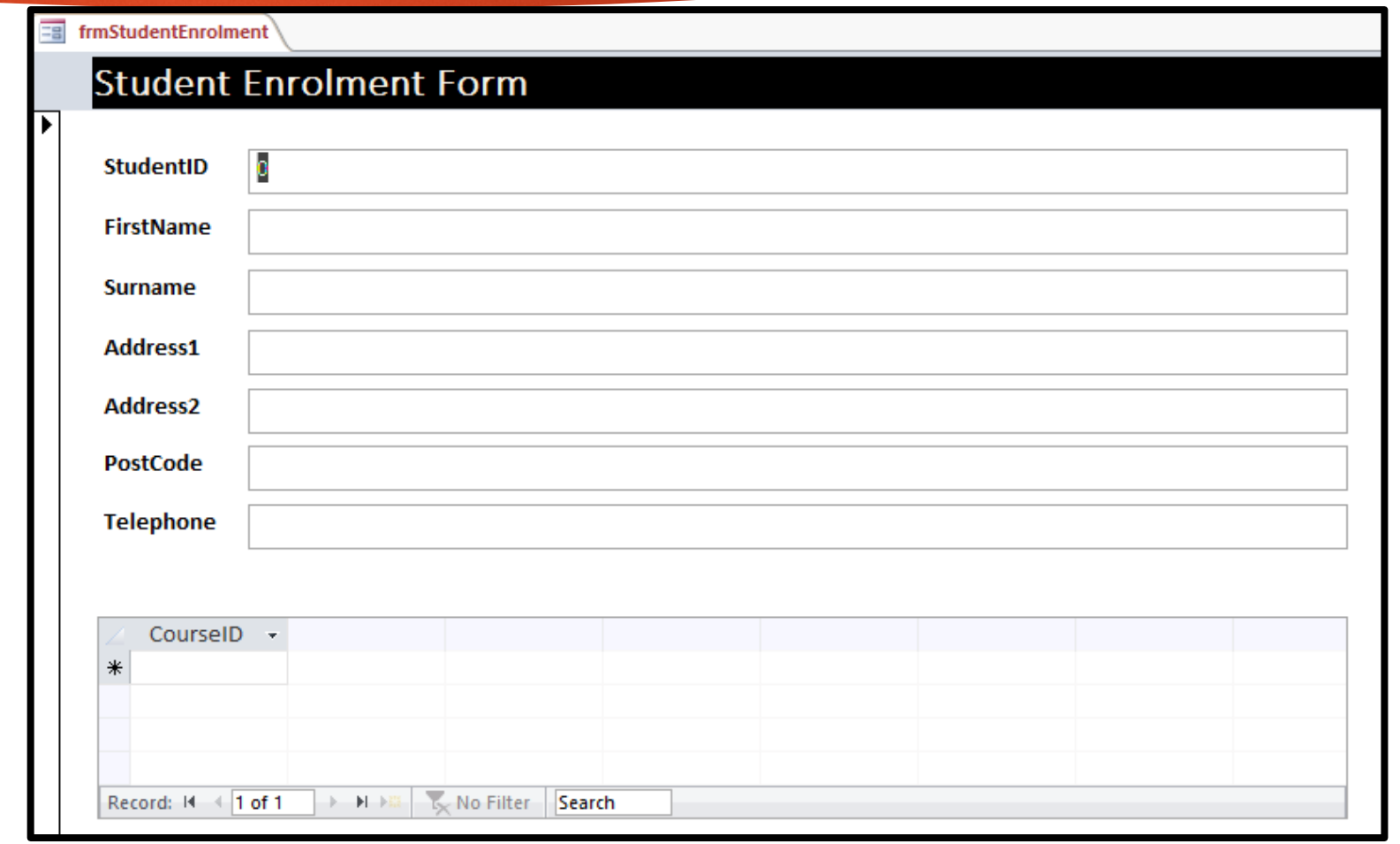
Database Queries

- Search for all students enrolled on Maths
- Save the query



Database Data Entry Form

- Database Designers try to make the database as easy as possible to use
- They create ‘Forms’ to make data entry easy
- You can join two tables together in one form
- It is important to have a good ‘user interface’



Database Main Menu

- Database Designers will create a main menu to open different components of the database
- They build a ‘User Interface’